

LISTING OF CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application.

1. (Withdrawn and Currently Amended) A seamless tubular polyimide film, comprising ~~polyimide having~~ an aromatic amic acid oligomer only having structural units derived from at least two aromatic tetracarboxylic acid derivatives and an approximately equimolar amount of at least one aromatic diamine, wherein

said at least two aromatic tetracarboxylic acid ~~components having~~ derivatives have a mixture of 15 to 55 mol % of asymmetric aromatic tetracarboxylic acid component and 85 to 45 mol % of symmetric aromatic tetracarboxylic acid component ~~and at least one aromatic diamine component, and~~

said [[the]] seamless tubular polyimide film ~~having~~ has a yield stress (σ_Y) of at least 120 MPa and ~~having~~ has a tensile strength to yield stress ~~stress~~ ratio (σ_{cr}/σ_Y) of at least 1.10.

2. (Withdrawn and Currently Amended) A semi-conductive seamless tubular polyimide film, wherein

carbon black is dispersed in polyimide having an aromatic amic acid oligomer only having structural units derived from at least two aromatic tetracarboxylic acid components having a mixture of 15 to 55 mol % of asymmetric aromatic tetracarboxylic acid component and 85 to 45 mol % of symmetric aromatic tetracarboxylic acid component and an approximately equimolar amount of at least one aromatic diamine component, the semi-conductive seamless tubular polyimide film having a surface resistivity of 10^3 to 10^{15} Ω/sq .

3. (Withdrawn) A semi-conductive seamless tubular polyimide film according to Claim 2, wherein

a log standard deviation of surface resistivity is 0.2 or smaller,
a log standard deviation of volume resistivity is 0.2 or smaller, and
a difference between a log surface resistivity and a log volume resistivity is 0.4 or smaller.

4. (Withdrawn and Currently Amended) A method for producing a seamless tubular polyimide film, comprising:

rotationally molding a mixed solution substantially in a monomeric state having a mixture of an aromatic amic acid oligomer only having structural units derived from at least two aromatic tetracarboxylic acid components comprising 15 to 55 mol % of asymmetric aromatic tetracarboxylic acid and/or ester thereof and 85 to 45 mol % of symmetric aromatic tetracarboxylic acid and/or ester thereof and an approximately equimolar amount of [[an]] at least one aromatic diamine component, to form a tubular shape, and
imidizing the tubular material by heating.

5. (Withdrawn and Currently Amended) A method for producing a semi-conductive seamless tubular polyimide film, comprising:

mixing an aromatic amic acid oligomer only having structural units derived from at least two aromatic tetracarboxylic acid components comprising 15 to 55 mol % of asymmetric aromatic tetracarboxylic acid and/or ester thereof and 85 to 45 mol % of symmetric aromatic

tetracarboxylic acid and/or ester thereof and an approximately equimolar amount of at least one aromatic diamine component, to form mixed solution substantially in a monomeric state, dispersing 1 to 35 parts by weight of carbon black in the mixed solution, per 100 parts by weight of a total amount of the aromatic tetracarboxylic acid component and the aromatic diamine component, to form a semi-conductive monomer mixed solution, rotationally molding the semi-conductive monomer mixed solution to form a tubular shape; and imidizing the tubular material by heating.

6. (Withdrawn) A semi-conductive seamless tubular polyimide film for use in an intermediate transfer belt in an electrophotographic system produced by a production method of Claim 5.

7. (Previously Presented) A semi-conductive aromatic amic acid composition comprising: an aromatic amic acid oligomer only having structural units derived from at least two aromatic tetracarboxylic acid derivatives and an approximately equimolar amount of at least one aromatic diamine; carbon black; and an organic polar solvent, wherein said at least two aromatic tetracarboxylic acid derivatives are a mixture of 15 to 55 mol% of asymmetric aromatic tetracarboxylic dianhydride and 85 to 45 mol% of symmetric aromatic tetracarboxylic dianhydride or a mixture of 15 to 55 mol% of asymmetric aromatic

tetracarboxylic acid diester and 85 to 45 mol% of symmetric aromatic tetracarboxylic acid diester.

8. (Previously Presented) A semi-conductive aromatic amic acid composition according to Claim 7, wherein the aromatic amic acid oligomer is obtained by polycondensation of a mixture of 15 to 55 mol% of asymmetric aromatic tetracarboxylic dianhydride and 85 to 45 mol% of symmetric aromatic tetracarboxylic dianhydride and an approximately equimolar amount of said at least one aromatic diamine in an organic polar solvent at about 80°C or lower.

9. (Cancelled)

10. (Previously Presented) A semi-conductive aromatic amic acid composition according to Claim 7, wherein the aromatic amic acid oligomer is obtained by polycondensation of a mixture of 15 to 55 mol% of asymmetric aromatic tetracarboxylic acid diester and 85 to 45 mol% of symmetric aromatic tetracarboxylic acid diester and an approximately equimolar amount of said at least one aromatic diamine in an organic polar solvent at about 90 to about 120°C.

11. (Cancelled)

12. (Original) A semi-conductive aromatic amic acid composition according to claim 7, wherein a number average molecular weight of the aromatic amic acid oligomer is about 1000 to about 7000.

13. (Original) A semi-conductive aromatic amic acid composition according to Claim 7, wherein carbon black is present in an amount of about 3 to about 30 parts by weight per 100 parts by weight of a total amount of aromatic tetracarboxylic acid component and organic diamine.

14. (Original) A method for producing a semi-conductive seamless tubular polyimide film, comprising:

rotationally molding a semi-conductive aromatic amic acid composition according to Claim 7; followed by heating.

15. (Original) A semi-conductive seamless tubular polyimide film for use in an intermediate transfer belt in an electrophotographic system produced by a production method according to Claim 14.

16. (Previously Presented) A method for producing a semi-conductive aromatic amic acid composition comprising:

subjecting at least two aromatic tetracarboxylic acid derivatives and an approximately equimolar amount of at least one aromatic diamine to partial condensation polymerization in an organic polar solvent, thereby yielding an aromatic amic acid oligomer solution only having structural units of the at least two aromatic tetracarboxylic acid derivatives and the at least one aromatic diamine; and

uniformly mixing electrically conductive carbon black powder with the oligomer solution,

wherein said at least two aromatic tetracarboxylic acid derivatives are a mixture of 15 to 55 mol% of asymmetric aromatic tetracarboxylic dianhydride and 85 to 45 mol% of symmetric aromatic tetracarboxylic dianhydride or a mixture of 15 to 55 mol% of asymmetric aromatic tetracarboxylic acid diester and 85 to 45 mol% of symmetric aromatic tetracarboxylic acid diester.

17. (Withdrawn and Currently Amended) A semi-conductive polyimide-based precursor composition, wherein carbon black is uniformly dispersed in a mixed solution prepared by mixing a high-molecular-weight polyimide precursor solution or high-molecular-weight polyamideimide solution in a nylon salt monomer solution in which an aromatic amic acid oligomer only having structural units derived from at least two aromatic tetracarboxylic acid diesters and an approximately equimolar amount of at least one aromatic diamine are dissolved in an organic polar solvent,

wherein said at least two aromatic tetracarboxylic acid diesters are 10 to 55 mol % of asymmetric aromatic tetracarboxylic acid diester and 90 to 45 mol % of symmetric aromatic tetracarboxylic acid diester.

18. (Canceled)

19. (Withdrawn) A semi-conductive polyimide-based precursor composition according to Claim 17, wherein said at least two aromatic tetracarboxylic acid diesters are 10 to 55 mol % of asymmetric 2,3,3',4'-biphenyl tetracarboxylic acid diester and 90 to 45 mol % of symmetric 3,3',4,4'-biphenyl tetracarboxylic acid diester.

20. (Withdrawn) A semi-conductive polyimide-based precursor composition according to Claim 17, wherein the high-molecular-weight polyimide precursor solution is a polyamic acid solution whose number average molecular weight is 10000 or larger and the high-molecular-weight polyamideimide solution is a polyamideimide solution whose number average molecular weight is 10000 or larger.

21. (Withdrawn) A semi-conductive polyimide-based precursor composition according to Claim 20, wherein the polyamic acid solution whose number average molecular weight is 10000 or larger is produced by reaction of diaminodiphenyl ether and an approximately equimolar amount of biphenyltetracarboxylic dianhydride in an organic polar solvent.

22. (Withdrawn) A semi-conductive polyimide-based precursor composition according to Claim 20, wherein the polyamideimide solution whose number average molecular weight is 10000 or larger is produced by reaction of acid anhydride comprising trimellitic acid anhydride and benzophenone tetracarboxylic dianhydride and an approximately equimolar amount of aromatic isocyanate in an organic polar solvent.

23. (Withdrawn) A method for producing a semi-conductive seamless tubular polyimide film, comprising:

rotationally molding a semi-conductive polyimide-based precursor composition according to Claim 17, to form a tubular shape; and
imidizing the tubular material by heating.

24. (Withdrawn) A semi-conductive seamless tubular polyimide-based film for use in an intermediate transfer belt in an electrophotographic system produced by a production method according to Claim 23, whose surface resistivity is 10^7 to 10^{14} Ω/sq .

25. (Withdrawn & Currently Amended) A method for producing a semi-conductive polyimide-based precursor composition, comprising:

mixing a high-molecular-weight polyimide precursor solution or high-molecular-weight polyamideimide solution in a nylon salt monomer solution in which an aromatic amic acid oligomer only having structural units derived from at least two aromatic tetracarboxylic acid diesters and an approximately equimolar amount of at least one aromatic diamine are dissolved in an organic polar solvent to prepare a mixed solution, said at least two aromatic tetracarboxylic acid diesters being 10 to 55 mol % of asymmetric aromatic tetracarboxylic acid diester and 90 to 45 mol % of symmetric aromatic tetracarboxylic acid diester, and

uniformly dispersing carbon black in the mixed solution.

26. (Withdrawn & Currently Amended) A method for producing a high-concentration semi-conductive polyimide precursor composition, comprising:

uniformly dispersing carbon black in an organic polar solvent to give a carbon black dispersion and

dissolving an aromatic amic acid oligomer only having structural units derived from at least two aromatic tetracarboxylic acid diesters and an approximately equimolar amount of aromatic diamine in the carbon black dispersion, said at least two aromatic tetracarboxylic acid diesters being 10 to 55 mol % of asymmetric aromatic tetracarboxylic acid diester and 90 to 45 mol % of symmetric aromatic tetracarboxylic acid diester.

27. (Canceled)

28. (Withdrawn) A method for producing a high-concentration semi-conductive polyimide precursor composition according to Claim 26, wherein the aromatic tetracarboxylic acid diester is a mixture of 10 to 55 mol % of asymmetric 2,3,3',4'-biphenyl tetracarboxylic acid diester and 90 to 45 mol % of symmetric 3,3',4,4'-biphenyl tetracarboxylic acid diester.

29. (Withdrawn) A method for producing a high-concentration semi-conductive polyimide precursor composition according to Claim 26, wherein carbon black is present in an amount of 5 to 35 parts by weight per 100 parts by weight of a total amount of the aromatic tetracarboxylic acid and the aromatic diamine.

30. (Withdrawn) A high-concentration semi-conductive polyimide precursor composition produced by a production method of Claim 26.

31. (Withdrawn) A method for producing a semi-conductive seamless tubular polyimide film, comprising:

rotationally molding a high-concentration semi-conductive polyimide precursor composition according to Claim 30, to form a tubular shape; and
imidizing the tubular material by heating.

32. (Withdrawn) A semi-conductive seamless tubular polyimide film for use in an intermediate transfer belt in an electrophotographic system produced by a method according to Claim 31, whose surface resistivity is 10^7 to $10^{14} \Omega/\text{sq.}$